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United States Department of Agriculture,

OFFICE OF EXPERIMENT STATIONS,

A. C. TRUE, Director.

LIST OF PUBLICATIONS OF THE OFFICE OF EXPERIMENT STATIONS ON IRRIGATION AND DRAINAGE.

[Corrected to November 30, 1905.]

FOR GRATUITOUS DISTRIBUTION.

[Requests for these publications should be sent to the Secretary of Agriculture or to a Senator or Representative in Congress.]

FARMERS' BULLETINS.

Farmers' Bulletin No. 46.—Irrigation in Humid Climates. By F. H. King, Professor of Agricultural Physics, College of Agriculture, University of Wisconsin, and Physicist of the Wisconsin Agricultural Experiment Station. Pp. 27, figs. 4.

Treats of the necessity, advantages, and methods of supplemental irrigation in humid regions.

Farmers' Bulletin No. 138.—Irrigation in Field and Garden. By E. J. Wickson, M. A. Pp. 40, figs. 18.

This bulletin discusses the subject from the standpoint of the individual farmer, and contains instructions on the determination of ditch levels, the measurement of small streams, sources of water supply and their use; the distribution of irrigation water; methods of applying water; the choice of an irrigation method; and the time for the application of water.

Farmers' Bulletin No. 158.—How to Build Small Irrigation Ditches. By C. T. Johnston and J. D. Stannard, Assistants in Irrigation Investigations, Office of Experiment Stations. Pp. 28, figs. 9.

This is a reprint of an article in the Yearbook of the Department of Agriculture for 1900, entitled "Practical Irrigation," giving methods for laying out and building small irrigating ditches, using only such implements as are found on most farms or can easily be made by the farmer.

Farmers' Bulletin No. 187.—Drainage of Farm Lands. By C. G. Elliott, Drainage Expert, Irrigation Investigations, Office of Experiment Stations. Pp. 40, figs. 19.

Explains the effects and advantages of drainage and describes implements and methods suited to a variety of conditions in humid and irrigated regions.

CIRCULARS.

Circular No. 50.—Preliminary Plans and Estimates for Drainage of Fresno District, California. By C. G. Elliott, Agent and Expert, Irrigation Investigations, Office of Experiment Stations. Pp. 9.

Circular No. 59.—Progress Report of Cooperative Investigations in California. Pp. 23.

The work of which this is a report included studies of duty of water, evaporation, methods of applying water, pumping water for irrigation, and laboratory tests of pumps. The full report is contained in Bulletin No. 158 (see p. 6).

Circular No. 63.—The Work of the Office of Experiment Stations in Irrigation and Drainage. Pp. 31.

This is the testimony of A. C. True, Director of the Office of Experiment Stations, and of Elwood Mead, Chief of Irrigation and Drainage Investigations of the Office, before the Committee on Irrigation of Arid Lands of the U. S. House of Representatives, at a hearing held February 11, 1905. It is a general statement of the work done by the Office, both as to character and location.

SEPARATES.

Some Engineering Features of Drainage. By C. G. Elliott, Drainage Expert. Pp. 231-244, pl. 1, figs. 2. (Reprint from Yearbook, 1902.)

This is a brief discussion of some general features of drainage and a description of some drainage works near Greeley, Colo.

Preparing Land for Irrigation. By R. P. Teele. Pp. 239-250, pls. 2, figs. 5. (Reprint from Yearbook, 1903.)

Discusses implements, methods, and cost.

Potato Culture near Greeley, Colorado. By J. Max Clark. Pp. 311-322, figs. 6. (Reprint from Yearbook, 1904.)

The Scope and Purpose of the Irrigation Investigations of the Office of Experiment Stations. By Elwood Mead, Irrigation Expert in Charge. Pp. iv, 417-437, pls. 4. (Reprint from Annual Report of Office of Experiment Stations for 1901.)

Review of Irrigation Investigations for 1902. By Elwood Mead, Chief of Irrigation Investigations, Office of Experiment Stations. Pp. iv, 359-385, pls. 6. (Reprint from Annual Report of Office of Experiment Stations for 1902.)

Review of Irrigation Investigations for 1903. By Elwood Mead, Chief of Irrigation Investigations, Office of Experiment Stations. Pp. iv, 469-502, pls. 6. (Reprint from Annual Report of Office of Experiment Stations for 1903.)

Report of Irrigation and Drainage Investigations, 1904. By Elwood Mead, Chief. Pp. iv, 425-472. (Reprint from Annual Report of Office of Experiment Stations for 1904.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 1. Review of the Irrigation Work of the Year 1904. By R. P. Teele. Pp. iii, 19-75. (Reprint from Office of Experiment Stations Bulletin 158.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 2. Irrigation in Santa Clara Valley, California. By S. Fortier. Mechanical Tests of Pumping Plants Used for Irrigation. By J. N. Le Conte. Pp. iv, 77-91, 195-255. (Reprint from Office of Experiment Stations Bulletin 158.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 3. The Distribution and Use of Water in Modesto and Turlock Irrigation Districts, California. By Frank Adams. Relation of Irrigation to Yield, Size, Quality, and Commercial Suitability of Fruits. By E. J. Wickson. Irrigation Conditions in Imperial Valley, California. By J. E. Roadhouse. Pp. iv, 93-109, 141-174, 175-194. (Reprint from Office of Experiment Stations Bulletin 158.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 4. Irrigation in Klamath County, Oregon. By F. L. Kent. Irrigation Investigations in the Yakima Valley, Washington, 1904. By O. L. Waller. Irrigation Conditions in Raft River Water District, Idaho, 1904. By W. F. Bartlett. Pp. iii, 257-266, 267-278, 279-302. (Reprint from Office of Experiment Stations Bulletin 158.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 5. Irrigation Investigations at New Mexico Experiment Station, Mesilla Park, 1904. By J. J. Vernon. Irrigation Investigations in Western Texas. By Harvey Culbertson. Pumping Plants in Texas. By C. E. Tait. Pp. iv, 303-317, 319-340, 341-346. (Reprint from Office of Experiment Stations Bulletin 158.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 6. Irrigation in Southern Texas. By Aug. J. Bowie, jr. Pp. iv, 347-507. (Reprint from Office of Experiment Stations Bulletin 158.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 7. Rice Irrigation in Louisiana and Texas in 1903 and 1904. By W. B. Gregory. Rice Irrigation on the Prairie Land of Arkansas. By C. E. Tait. Pp. iv, 509-544, 545-565. (Reprint from Office of Experiment Stations Bulletin 158.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 8. Irrigation Experiments at Fort Hays, Kansas, 1903 and 1904. By J. G. Haney. Irrigation near Garden City, Kansas, 1904. By A. E. Wright and A. B. Collins. Pumping Plants in Colorado, Nebraska, and Kansas. By O. V. P. Stout. Irrigation near Rockyford, Colorado, 1904. By A. E. Wright. The Irrigation and Drainage of Cranberry Marshes in Wisconsin. By A. R. Whitson. Pp. iv, 567-583, 585-594, 595-608, 609-623, 625-642. (Reprint from Office of Experiment Stations Bulletin 158.)

Annual Report of Irrigation and Drainage Investigations, 1904. Separate No. 9. By C. G. Elliott. Pp. vi, 643-743. (Reprint from Office of Experiment Stations Bulletin 158.)

Separates from Bulletins 100, Irrigation Investigations in California; 119, Report of Irrigation Investigations, 1901; and 133, Report of Irrigation Investigations, 1902, are also available for free distribution.

MISCELLANEOUS.

Irrigation and Drainage Investigations of the Office of Experiment Stations. By R. P. Teele. Pp. 23, pls. 2, figs. 5.

A general account intended primarily for distribution at the Louisiana Purchase Exposition.

FOR SALE.

[To secure these publications, address the Superintendent of Documents, Government Printing Office, Washington, D. C., inclosing price given. Remittances must be made by cash or United States postal order. Postage stamps and checks not accepted.]

BULLETINS.

Bulletin No. 60.—Abstract of Laws for Acquiring Title to Water from the Missouri River and Its Tributaries, with the Legal Forms in Use. Compiled by Elwood Mead, State Engineer of Wyoming. Pp. 77. Price 10 cents.

Includes abstracts of laws and legal forms in use in Colorado, Kansas, Montana, Nebraska, South Dakota, Wyoming, and the Northwest Territories of Canada.

Bulletin No. 70.—Water-right Problems of Bear River. By Clarence T. Johnston and Joseph A. Breckons. Pp. 40, pls. 9. Price 15 cents.

Presents some of the water-right complications of interstate streams as illustrated on Bear River. The bulletin discusses the water supply of the river and its diversion, the controversies which have arisen regarding water rights, and the need of uniform laws.

Bulletin No. 92.—The Reservoir System of the Cache la Poudre Valley. By E. S. Nettleton. Pp. 48, pls. 14. Price 15 cents.

A description of the reservoir system of the Cache la Poudre Valley, showing the benefits to be derived from the construction of reservoirs for the storage of water for irrigation.

Bulletin No. 96.—Irrigation Laws of the Northwest Territories of Canada and Wyoming, with Discussions by J. S. Dennis, Deputy Commissioner of Public Works, Canada, and Fred Bond, State Engineer of Wyoming, and J. M. Wilson, Agent and Expert, Irrigation Investigations, Office of Experiment Stations. Pp. 90, frontispiece, pls. 5. Price 10 cents.

Texts of the irrigation laws of the Northwest Territories of Canada and Wyoming, with the regulations, forms, and methods of procedure adopted in the administration of these laws, and a discussion of the principles underlying the laws and methods followed in their enforcement.

Bulletin No. 100.—Report of Irrigation Investigations in California, under the direction of Elwood Mead, Expert in Charge. Including a discussion of the Agricultural Situation in California, by Elwood Mead, and reports by Special Agents and Observers, as follows: The Irrigation Problems of Honey Lake Basin, Cal., by William E. Smythe; Features and Water Rights of Yuba River, Cal., by Marsden Manson; Irrigation Investigations on Cache Creek, by J. M. Wilson; Report on Irrigation Problems in the Salinas Valley, by C. D. Marx; Irrigation from the San Joaquin River, by Frank Soulé; Water Appropriation from Kings River, by C. E. Grunsky; A Study of Water Rights on the Los Angeles River, Cal., by Edward M. Boggs; Problems of Water Storage on Torrential Streams of Southern California as Typified by Sweetwater and San Jacinto Rivers, by James D. Schuyler. Pp. 411, pls. 29, figs. 16. Price: Paper, 90 cents; cloth, \$1.25.

This report deals with investigations carried on during the summer of 1900 in cooperation with the California Water and Forest Association. In addition to a review of the agricultural situation in the State, it presents a comprehensive discussion of the water laws and customs under which irrigation is practiced in California as typified by the conditions in Honey Lake Basin, and on Yuba River, Cache Creek, Salinas River, San Joaquin River, Kings River, Los Angeles River, Sweetwater River, and San Jacinto River. It describes the methods and means by which water is diverted from these streams and used for irrigation, and the indefinite and excessive appropriations of waters and the resulting litigation, and discusses the evils resulting from absence of State control of streams. Separates of the different articles of this report have been printed.

Bulletin No. 118.—Irrigation from Big Thompson River. By John E. Field, Assistant State Engineer of Colorado. Pp. 75, pls. 5, fig. 1. Price 10 cents.

This is a study of the water laws of Colorado as illustrated by irrigation from Big Thompson River. Mr. Field discusses more particularly the "water loaning" law.

Bulletin No. 124.—Report of Irrigation Investigations in Utah, under the direction of Elwood Mead, Chief of Irrigation Investigations, Office of Experiment Stations. Including General Discussion of Irrigation in Utah, and Irrigation from Jordan River, by R. P. Teele;

Irrigation in Utah Lake Drainage System, by A. P. Stover; The Spanish Fork River Irrigation System, by A. F. Doremus; Irrigation in the Weber Valley, by Jay D. Stannard; Agriculture Under Irrigation in the Basin of Virgin River, and Court Adjudications of Water Rights on Sevier River, by Frank Adams; Appropriations of Water from Logan River, by George L. Swendsen. Pp. 330, pls. 19, figs. 2. Price \$1.10.

A detailed study of the irrigation laws, institutions, and practice of Utah.

Bulletin No. 130.—Egyptian Irrigation. By Clarence T. Johnston, Assistant Chief of Irrigation Investigations, Office of Experiment Stations. Pp. 100, pls. 24, figs. 9. Price 30 cents.

This is a study of the irrigation laws and practices in Egypt, made with special reference to suggestions for improvements in American irrigation.

Bulletin No. 131.—Plans of Structures in Use on Irrigation Canals in the United States, prepared under the direction of Elwood Mead, Chief of Irrigation Investigations, Office of Experiment Stations. Pp. 51, pls. 22. Price 60 cents.

This is an album of plans for irrigation structures, designed by leading irrigation engineers of the West, made from drawings exhibited at Paris in 1900 and at Buffalo in 1901.

Bulletin No. 134.—Storage of Water on Cache La Poudre and Big Thompson Rivers. By C. E. Tait, Assistant in Irrigation Investigations, Office of Experiment Stations. Pp. 100, pls. 5, figs. 10. Price 10 cents.

This bulletin gives details of areas, capacities, and construction of reservoirs in northern Colorado, and the profits from their use.

Bulletin No. 140.—Acquirement of Water Rights in the Arkansas Valley, Colorado. By J. S. Greene, ex-State Engineer of Colorado. Pp. 83, pl. 1, fig. 1. Price 5 cents.

This bulletin discusses the water laws of Colorado and the provisions of water-right contracts in relation to the physical conditions of the Arkansas Valley of Colorado. It is intended to give settlers an understanding of the points which should be looked into before they take steps toward acquiring water rights. It is also believed to be of value to students of irrigation institutions.

Bulletin No. 144.—Irrigation in Northern Italy—Part I. By Elwood Mead, Chief of Irrigation Investigations, Office of Experiment Stations. Pp. 100, frontispiece, pls. 17, figs. 14. Price 20 cents.

This is the first of three bulletins to be published giving the results of a study of Italian irrigation practice, laws, and institutions. The study was made solely from the standpoint of getting suggestions for improvements in our American systems, and it was found that we could learn much from Italy. The first bulletin contains reports on irrigation in Lombardy and Piedmont.

Bulletin No. 145.—Preparing Land for Irrigation and Methods of Applying Water. Prepared by the Agents of Irrigation Investigations. Pp. 84, pls. 7, figs. 33. Price 15 cents.

This bulletin gives descriptions of methods of removing sagebrush, of smoothing land, of laying out fields for different systems of applying water, and of the different systems of applying water. The various methods are compared as to cost and efficiency.

Bulletin No. 146.—Current Wheels: Their Use in Lifting Water for Irrigation. Prepared in the Office of Experiment Stations, Irrigation Investigations. Pp. 38, pls. 4, figs. 21. Price 10 cents.

Drawings and photographs of a large number of wheels used for raising water from streams are given, accompanied by descriptions, statements of cost, and discussions of efficiency. A general discussion of the theory of current wheels is also given.

Bulletin No. 147.—Report on Drainage Investigations in 1903. By C. G. Elliott, Drainage Expert, Irrigation Investigations, Office of Experiment Stations. Pp. 62, pls. 5, figs. 12. Price 10 cents.

This is a report of the work done by Mr. Elliott during the year 1903. It includes discussions of plans for drainage near Fresno, Cal.; in the Yakima and Atanum valleys, Washington; in the Grey Bull Valley, Wyoming; in the Missouri Valley and in Hancock County, Iowa; and of drainage as a preventive of hillside erosion in Georgia.

Bulletin No. 148.—Report on Irrigation Investigations in Humid Sections of the United States in 1903. Under the direction of Elwood Mead, Chief of Irrigation Investigations. Pp. 45, pls. 3. Price 10 cents.

This bulletin contains descriptions of several irrigation plants in market gardens near the large eastern cities, and reports of experiments with irrigation in New Jersey and Missouri; also a report on irrigation in the artesian basin of South Dakota.

Bulletin No. 157.—Water Rights on Interstate Streams: The Platte River and Tributaries. By R. P. Teele and Elwood Mead. Pp. 118, pls. 4, figs. 3. Price 10 cents.

The Platte River and its tributaries lie within three States—Colorado, Wyoming, and Nebraska. The one source of supply is, therefore, subject to the laws of three States. This report is a discussion of the rights to water from this source of supply, as they have arisen under the laws and physical conditions in the three States. Mr. Teele gives the results of the field work and Doctor Mead a general discussion of water laws.

Bulletin No. 158.—Annual Report of Irrigation and Drainage Investigations, under the direction of Elwood Mead, Chief of Irrigation and Drainage Investigations, Office of Experiment Stations, containing reports as follows: Summary, by R. P. Teele; Irrigation in Santa Clara Valley, Cal., by S. Fortier; The Distribution and Use of Water in Modesto and Turlock Irrigation Districts, Cal., by Frank Adams; The Relation of Irrigation to the Yield, Size, Quality, and Commercial Suitability of Fruits, by E. J. Wickson; Irrigation Conditions in Imperial Valley, Cal., by J. E. Roadhouse; Mechanical Tests of Pumping Plants used for Irrigation, by J. N. Le Conte; Irrigation in Klamath County, Oreg., by F. L. Kent; Irrigation Investigations in Yakima Valley, Wash., 1904, by O. L. Waller; Irrigation Conditions in Raft River Water District, Idaho, in 1904, by W. F. Bartlett; Report of Irrigation Investigations at New Mexico Agricultural Experiment Station, Mesilla Park, for the Season of 1904, by J. J. Vernon; Irrigation Investigations in Western Texas, by Harvey Culbertson; Pumping Plants in Texas, by C. E. Tait; Irrigation in Southern Texas, by A. J. Bowie, jr.; Rice Irrigation in Louisiana and Texas in 1903 and 1904, by W. B. Gregory; Rice Irrigation on the Prairie Lands of Arkansas, by C. E. Tait; Irrigation Experiments at Fort Hays, Kans., by J. G. Haney; Irrigation at Garden City, Kans., by A. B. Collins and A. E. Wright; Pumping Plants in Colorado, Nebraska, and Kansas, by O. V. P. Stout; Irrigation near Rockyford, Colo., by A. E. Wright; The Irrigation and Drainage of Cranberry Marshes in Wisconsin, by A. R. Whitson; and Report of Drainage Investigations, 1904, by C. G. Elliott. Pp. 755, pls. 12, figs. 129.

This is the general report of Irrigation and Drainage Investigations in 1904. The complete report was issued in limited edition which is now exhausted, but it has been reprinted in form of nine separates (see pp. 2 and 3) for free distribution.

